

Figure 1: System Model

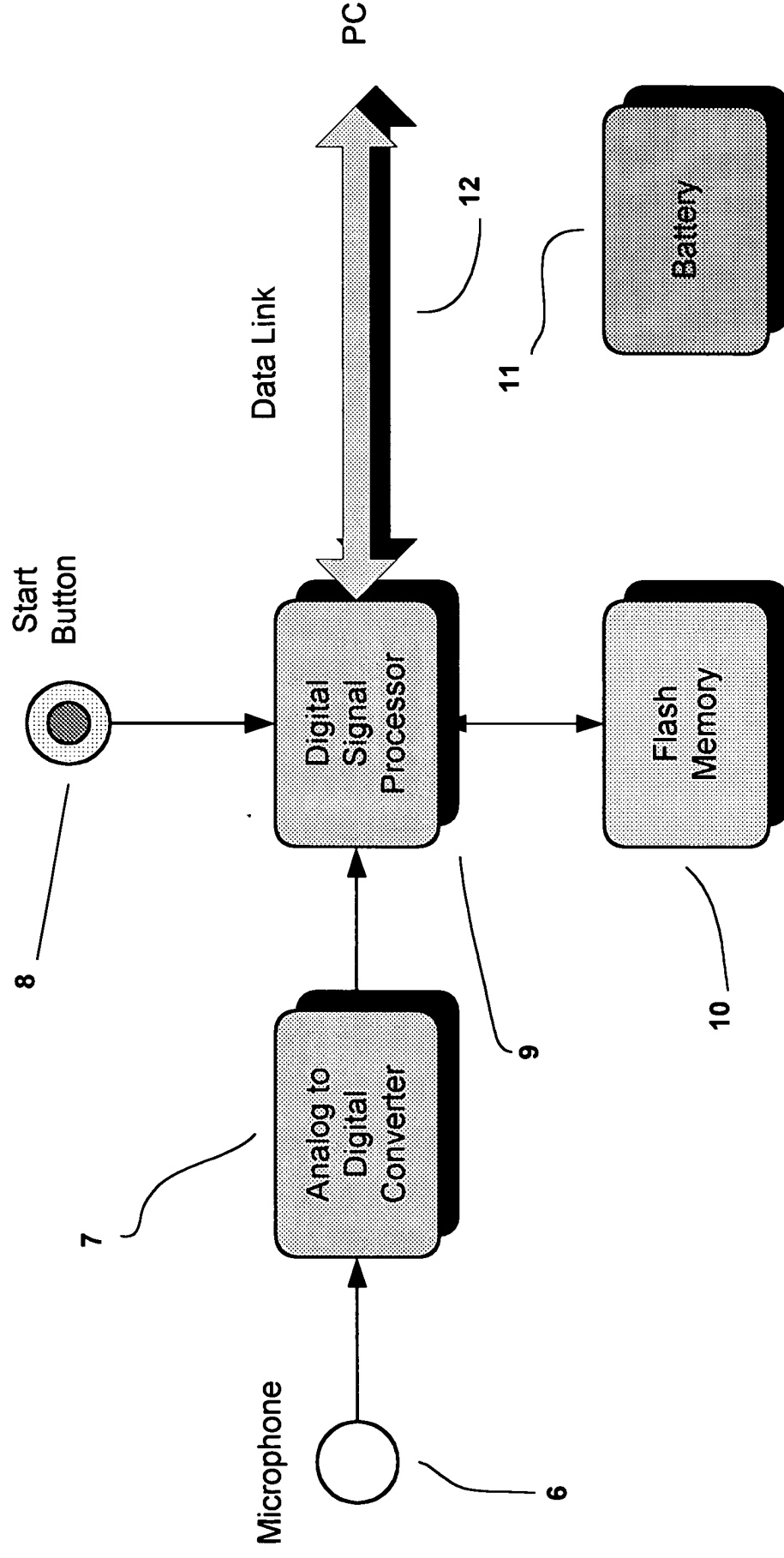


Figure 2: Typical Audio Capture Device

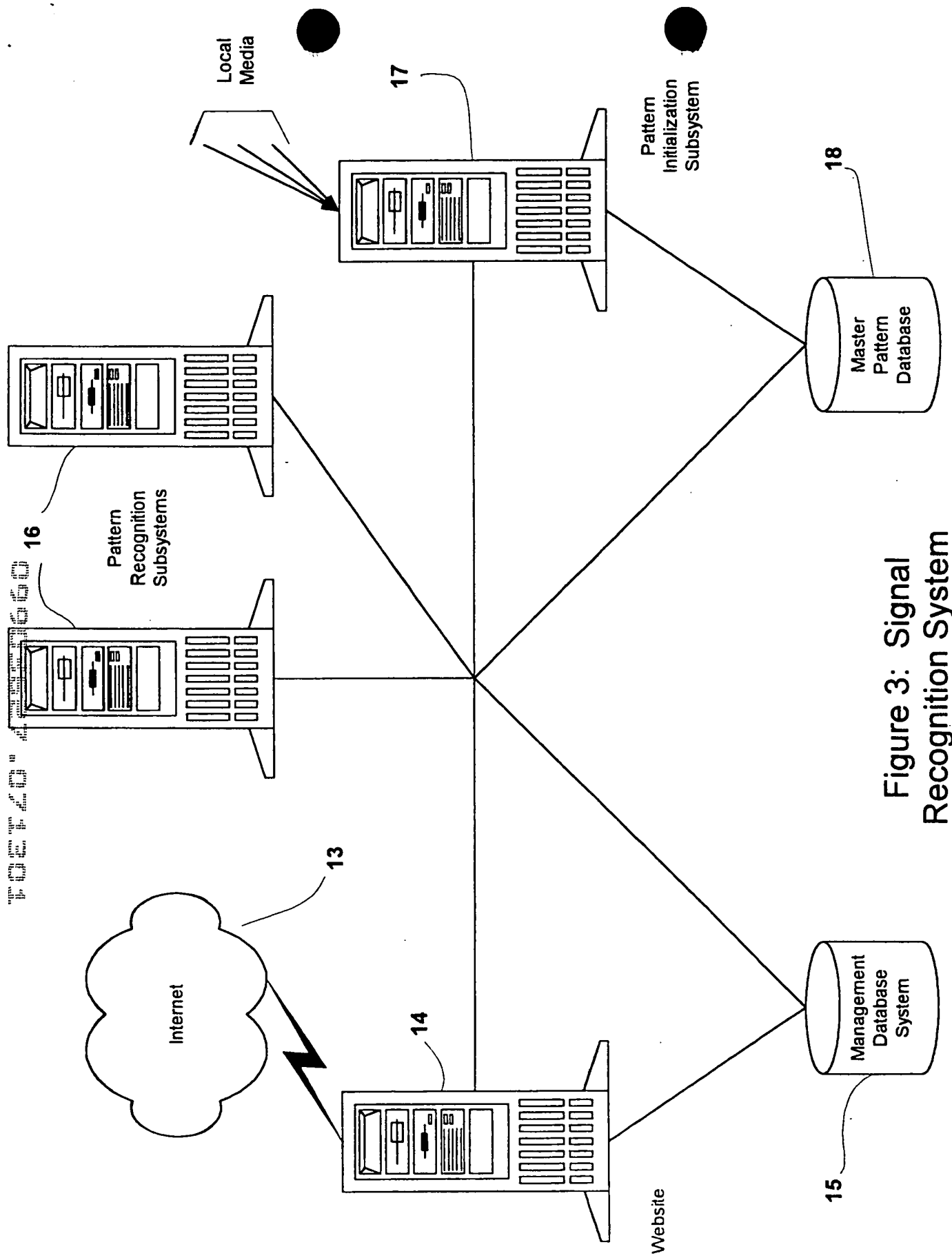


Figure 3: Signal Recognition System

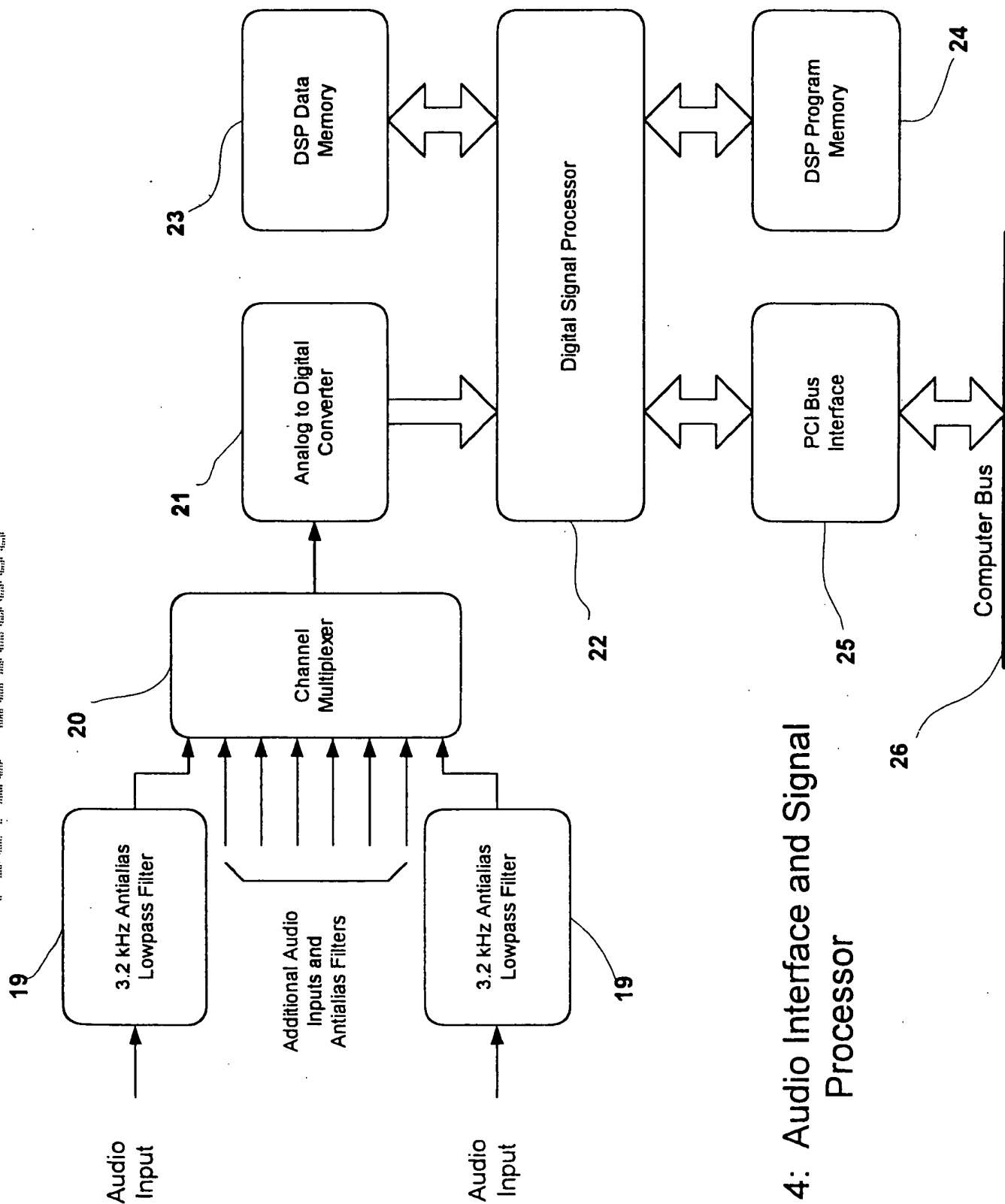


Figure 4: Audio Interface and Signal Processor

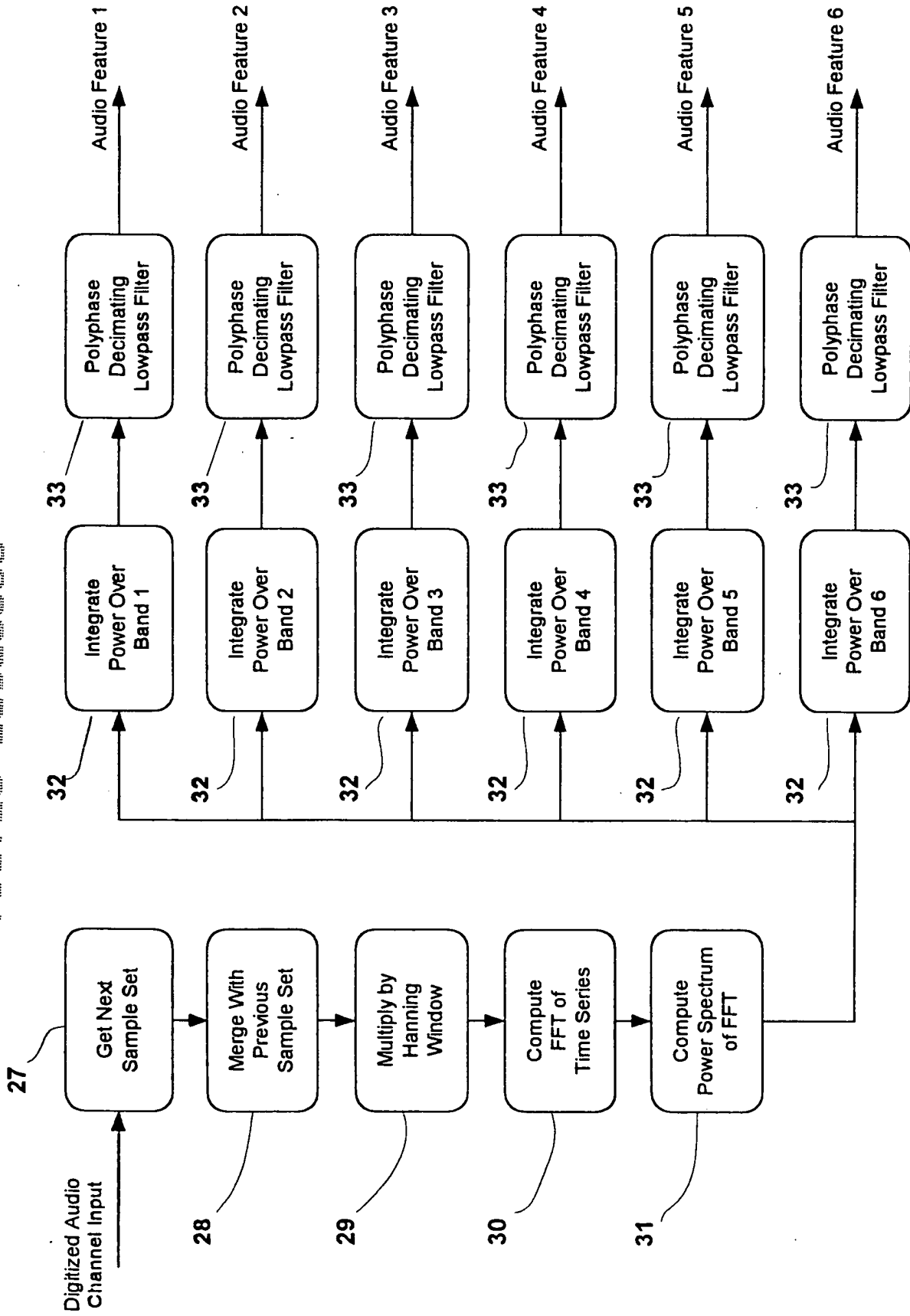


Figure 5: Audio Spectrum Analysis and Feature Extraction

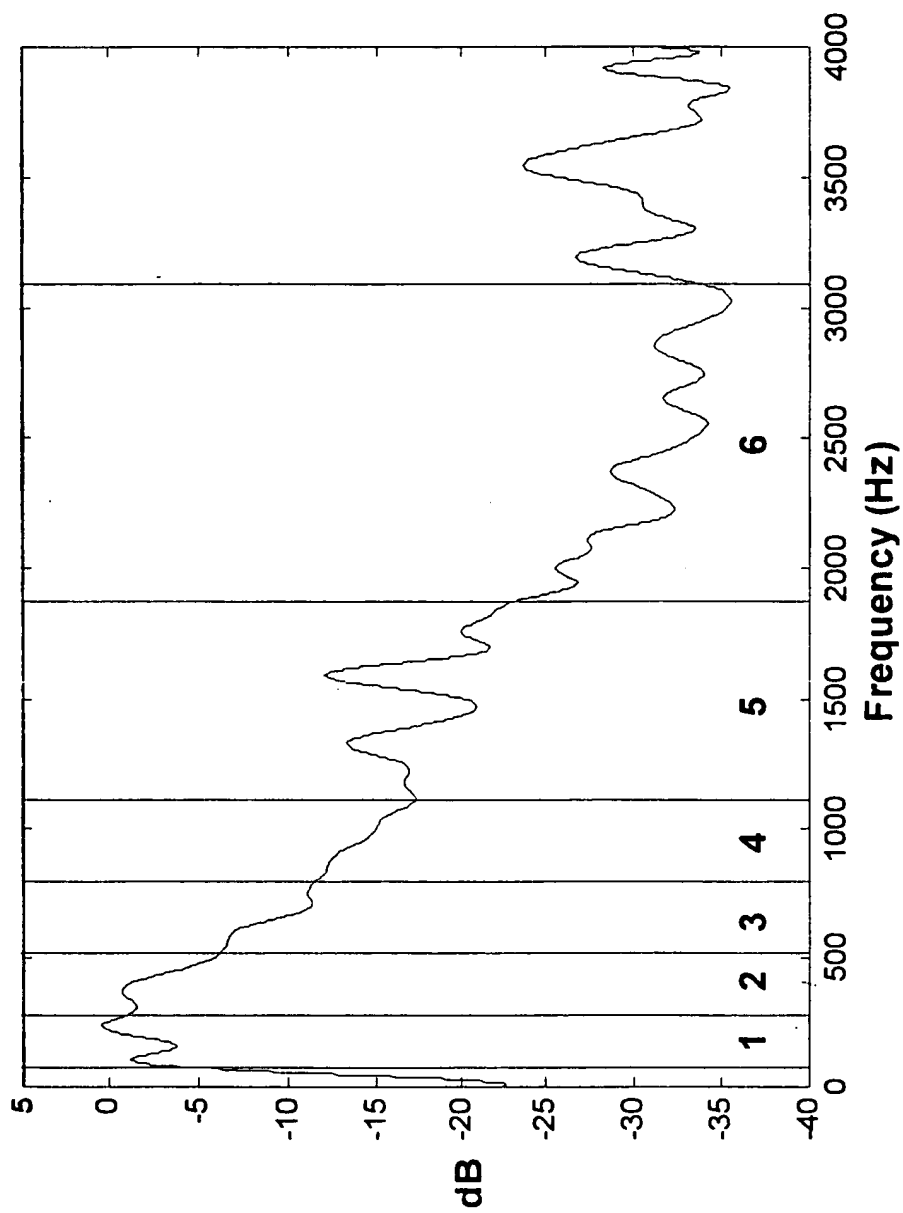


Figure 6: Audio Spectrum Analysis Bands

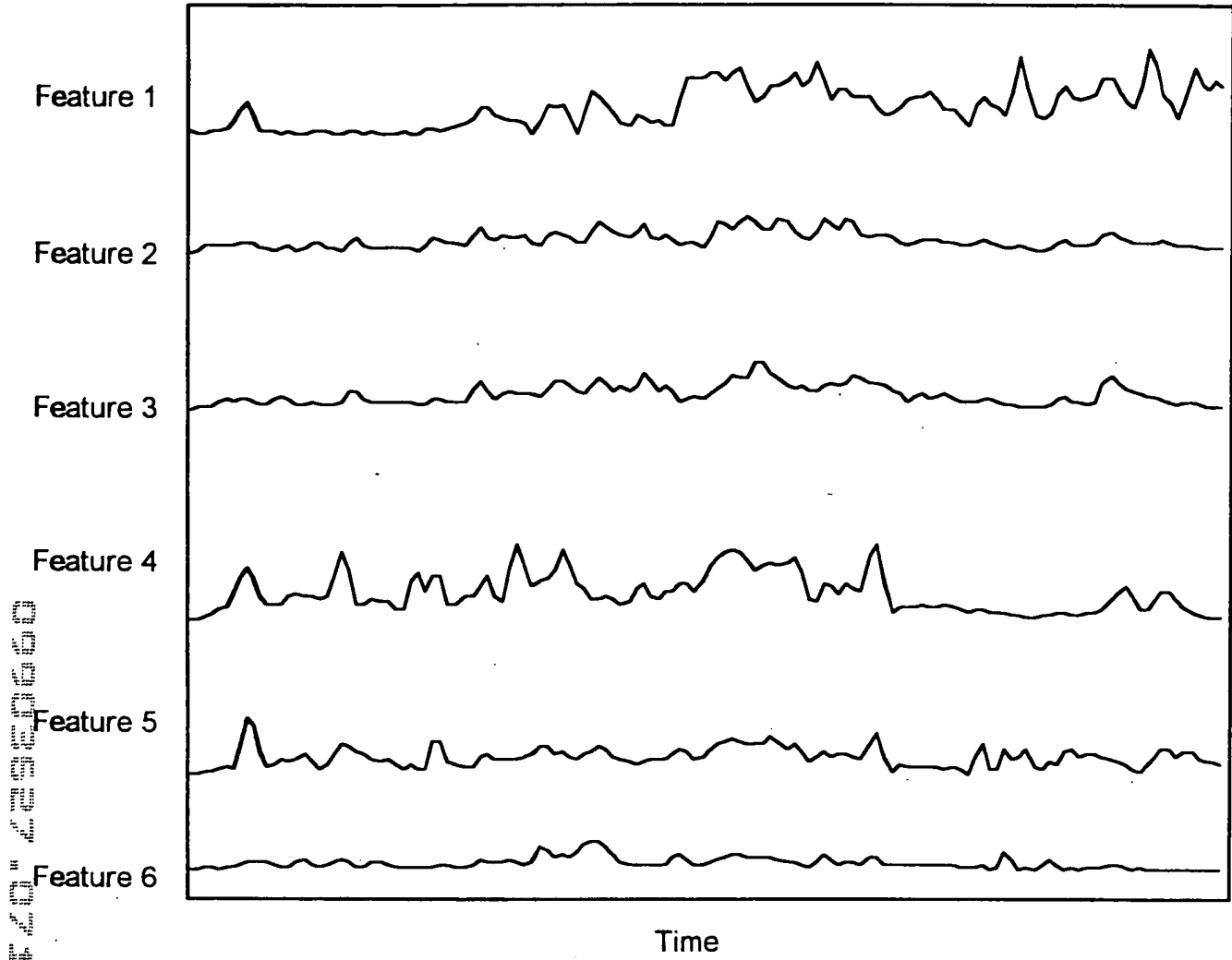


Figure 7: Example Feature Waveforms

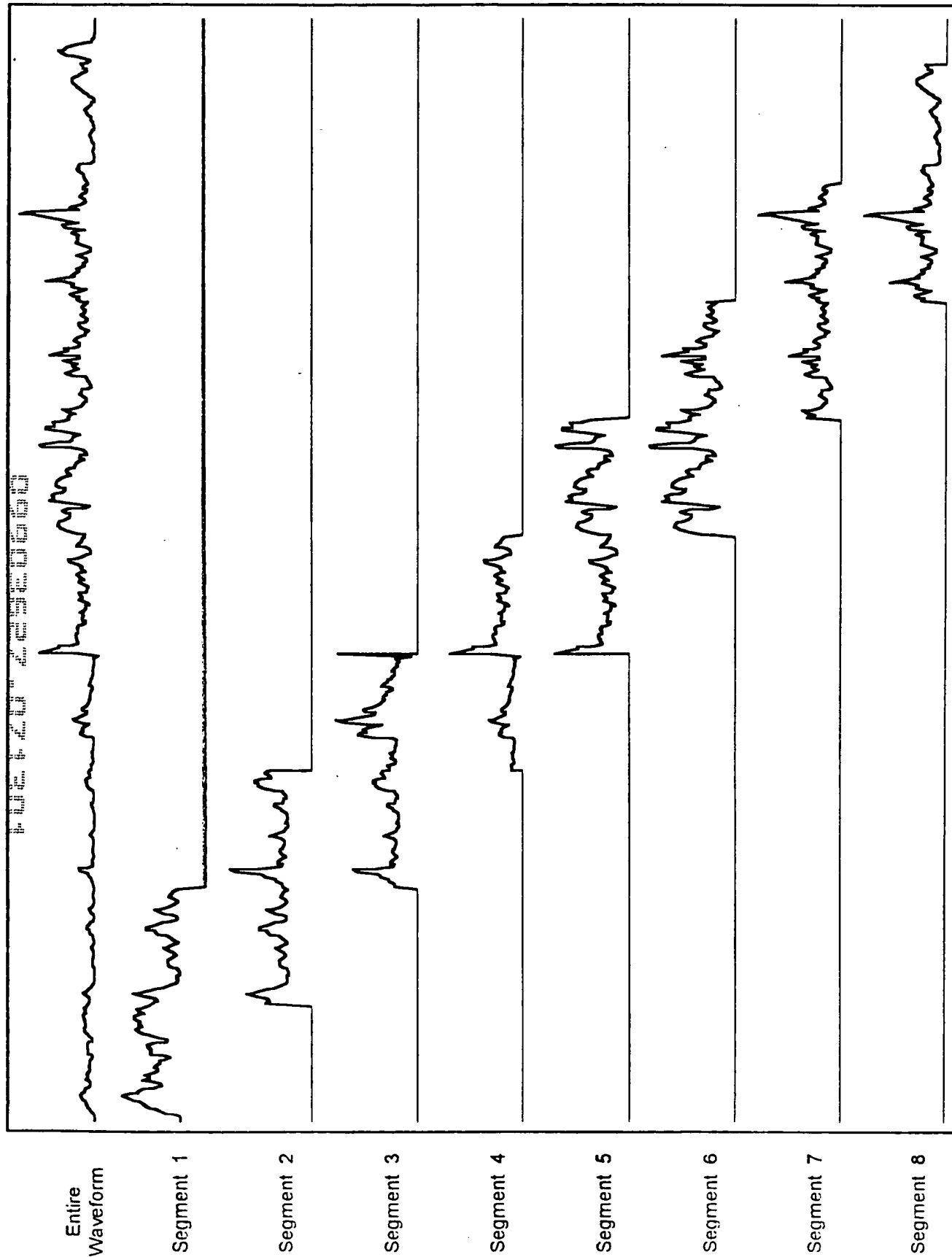


Figure 8: Reference Feature Waveform Segmentation

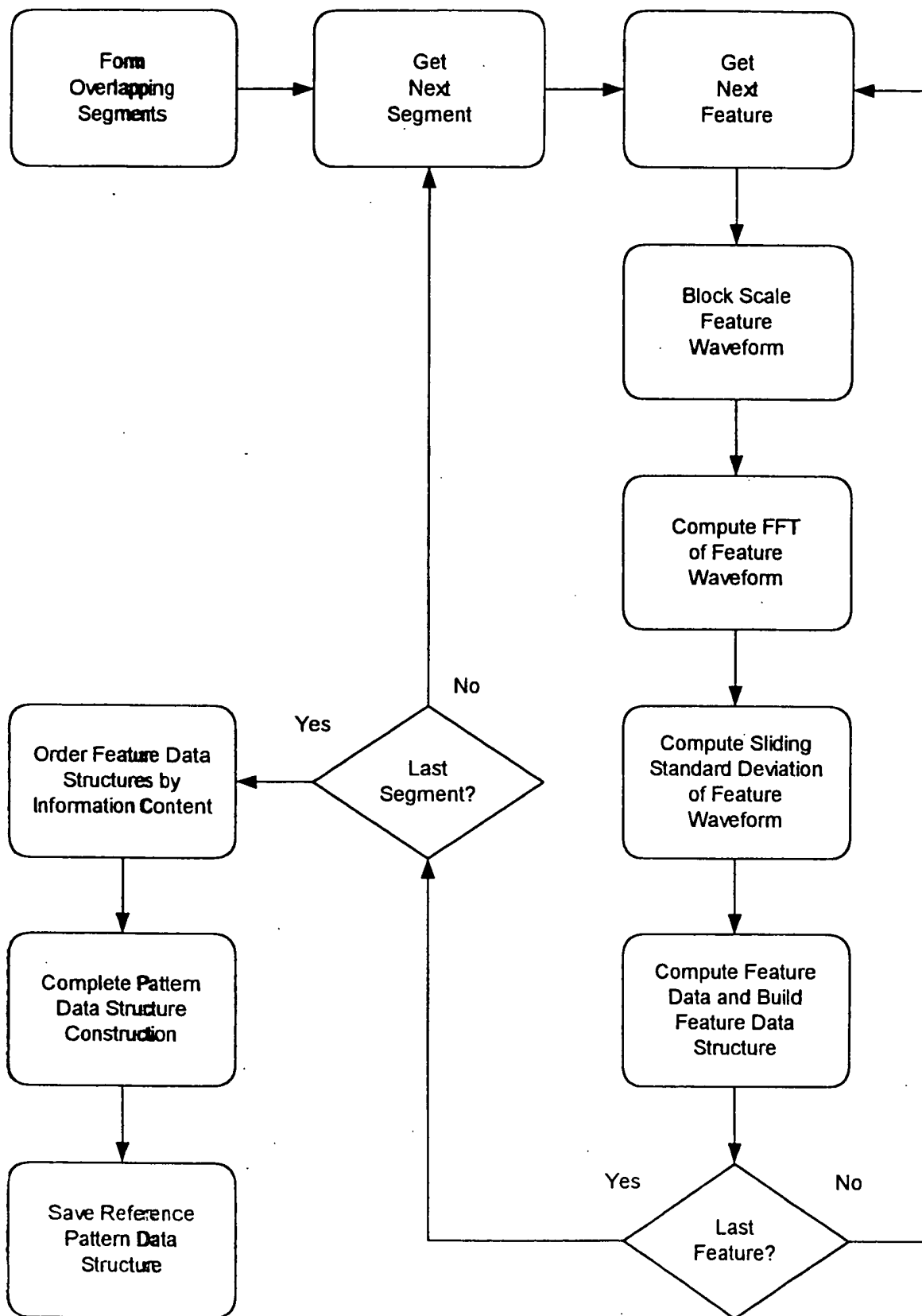


Figure 9: Reference Pattern Initialization

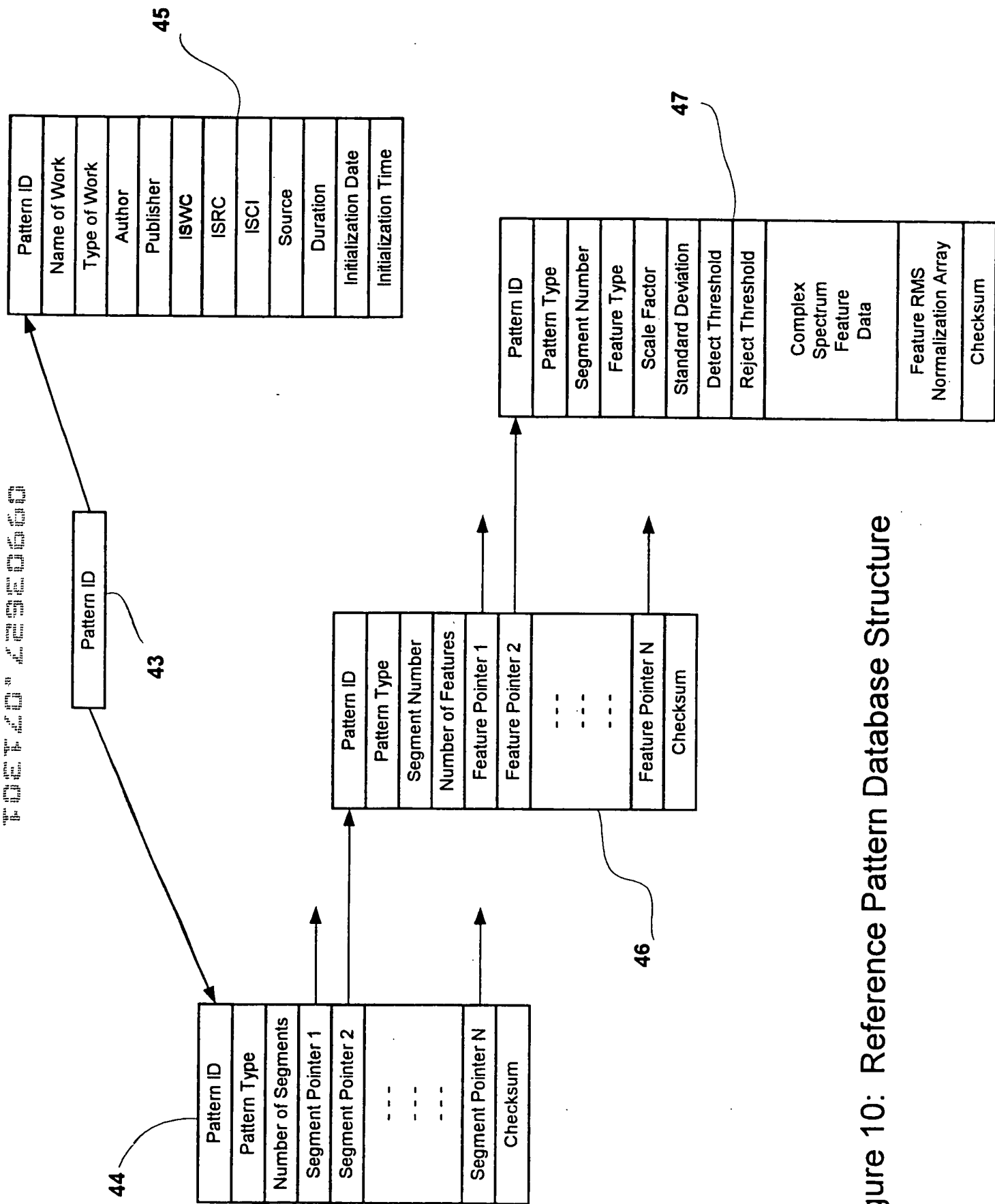


Figure 10: Reference Pattern Database Structure

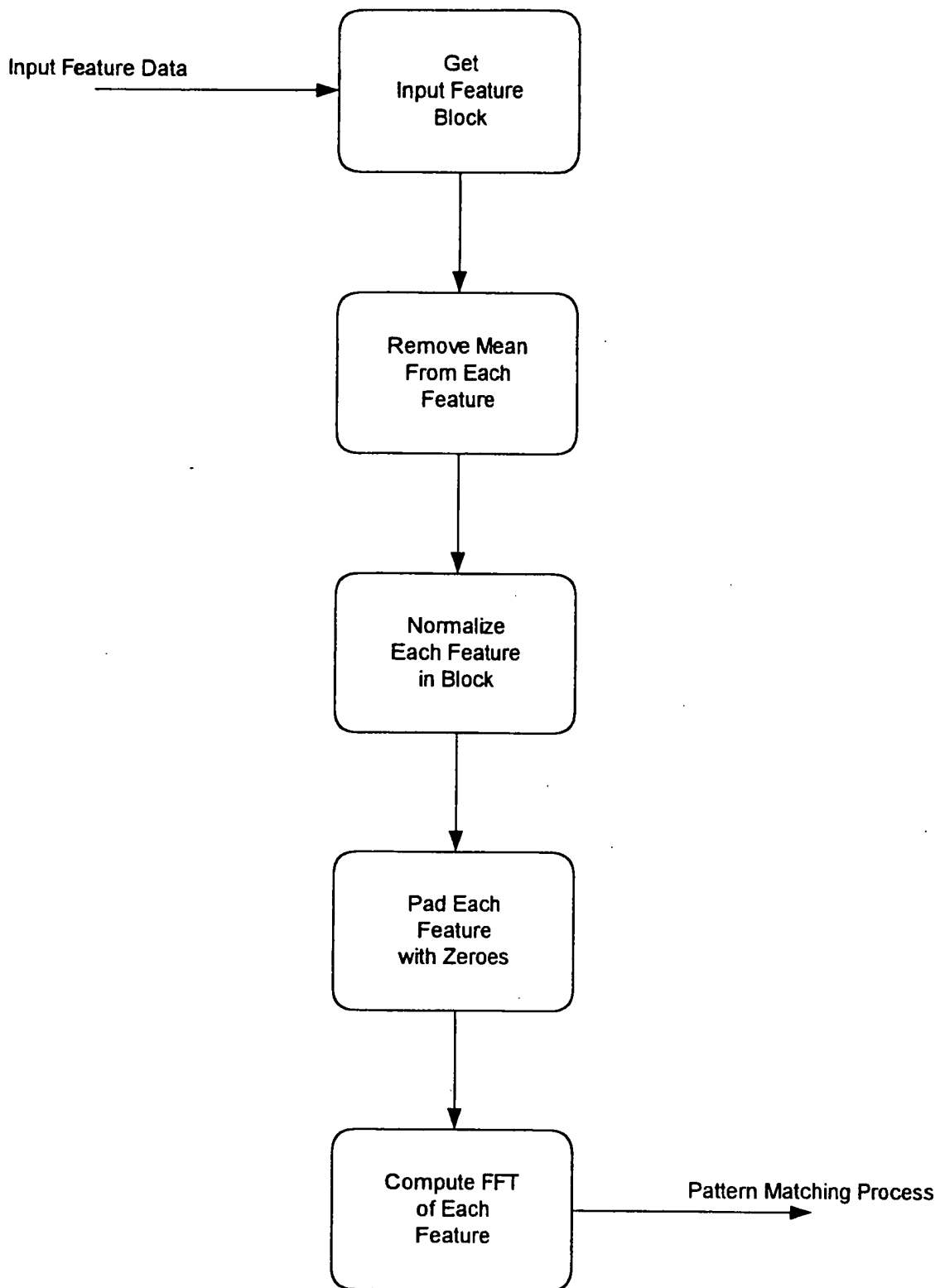


Figure 11: Real-Time Feature Block Pre-Processing

TOP SECRET

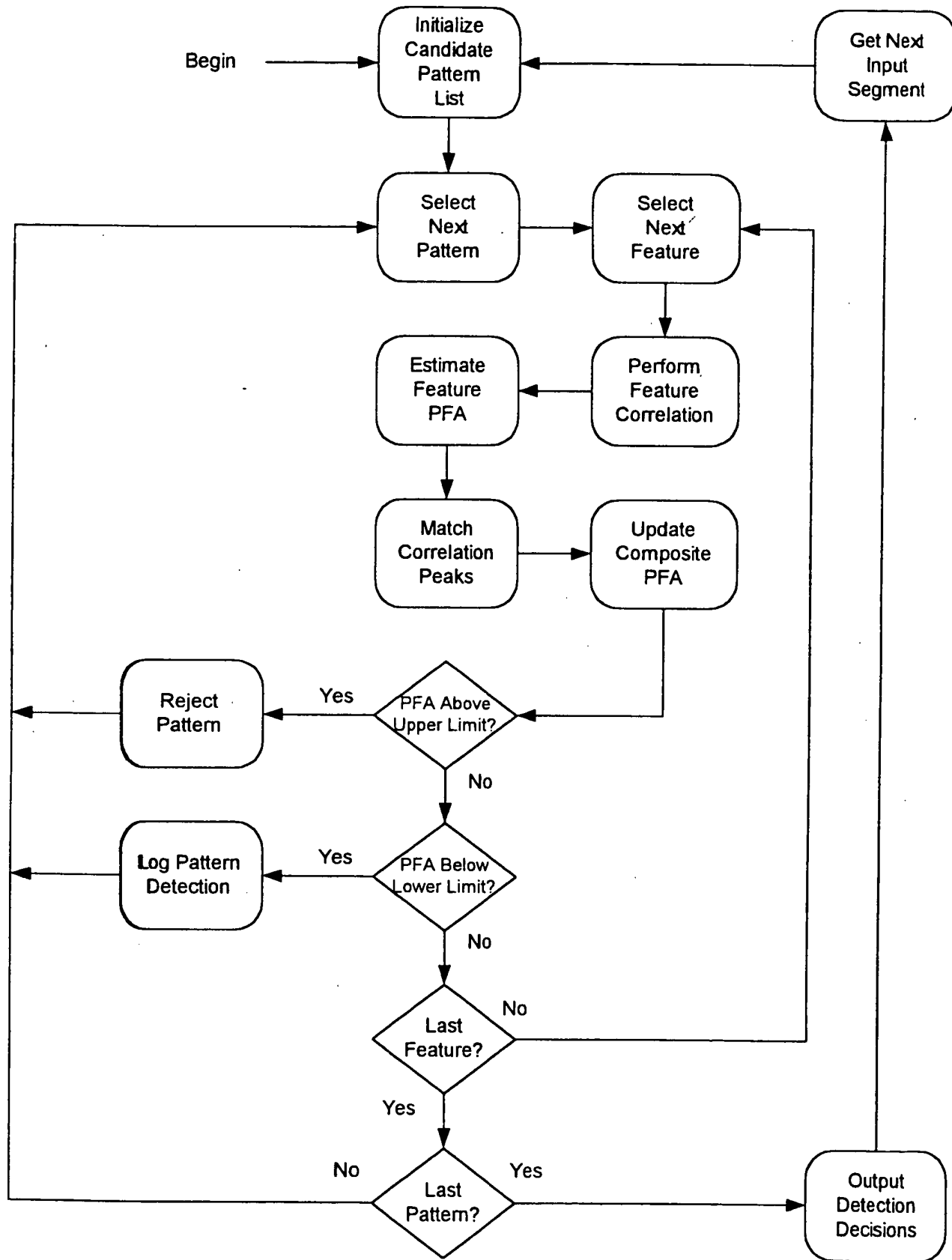


Figure 12: Multiple Feature Correlation Process

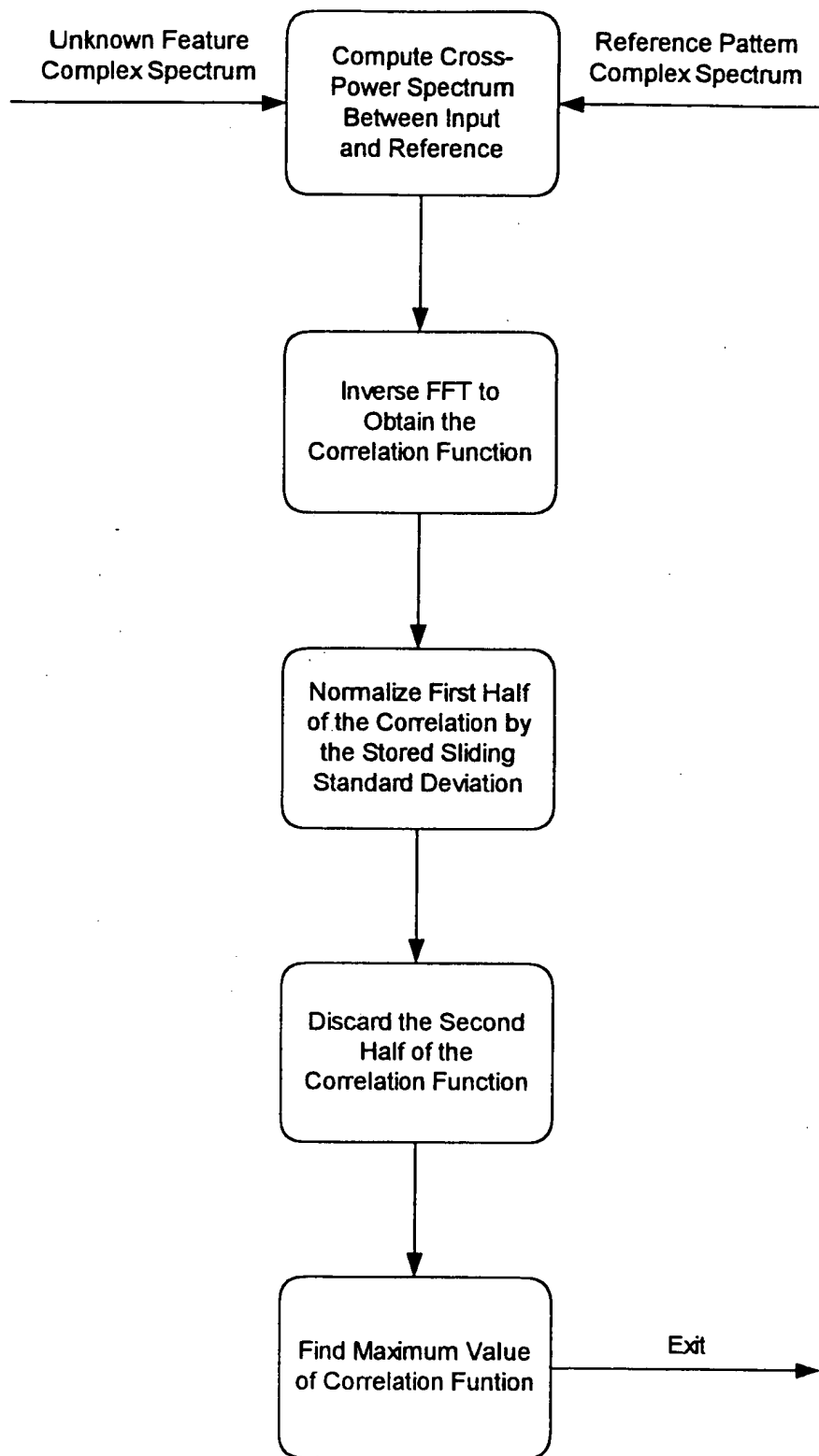


Figure 13: Feature Correlation Process

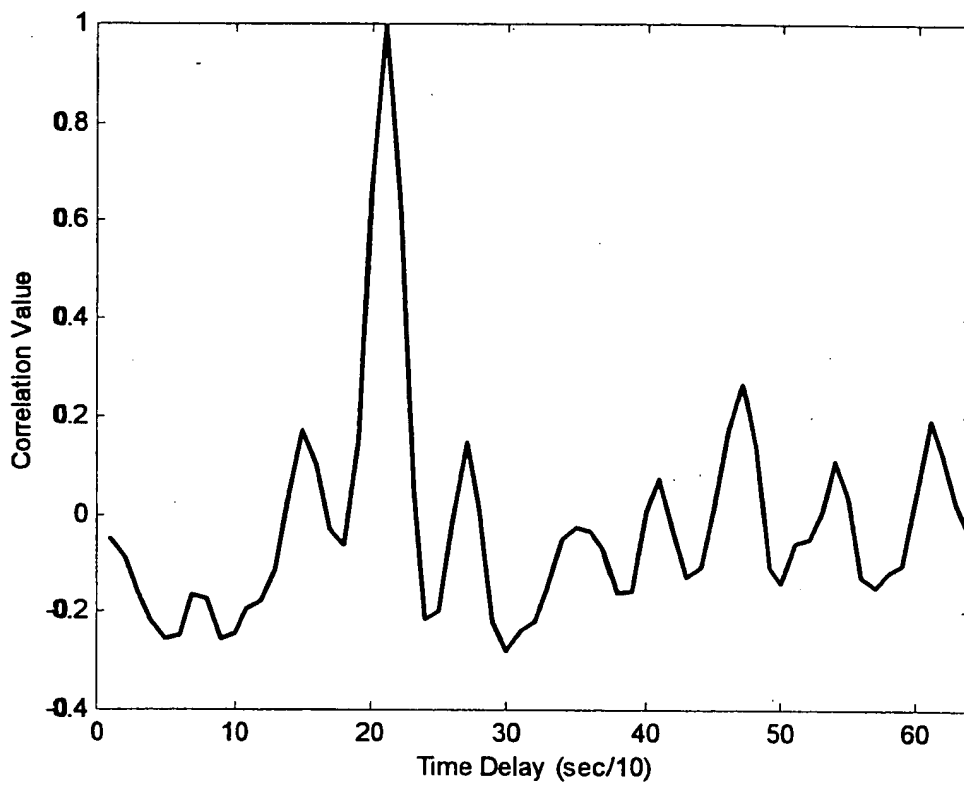
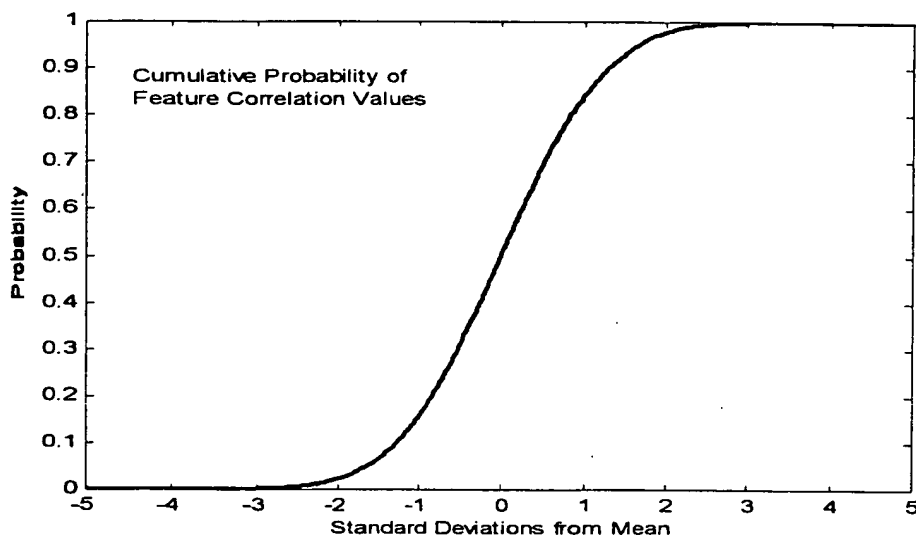


Figure 14: Example Feature Correlation Function

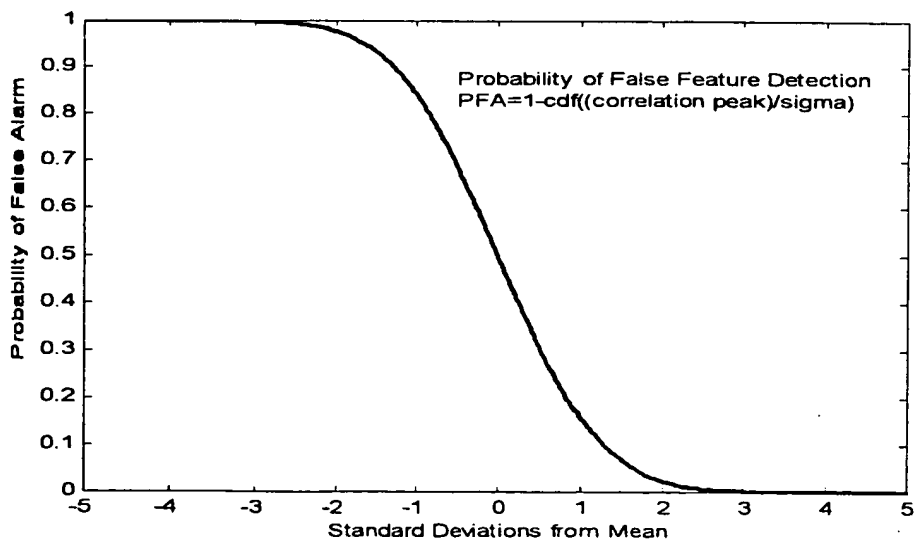
Probability Density Function of Feature Correlation Values

Standard Deviations from Mean

(A)



(B)



(C)

Figure 15: False Detection Estimation from Correlation Values